Non-GAAP Tax Rate: Do Managers Use It to Achieve Earnings Targets?

Abstract

In this study, we examine tax reporting in a non-GAAP setting. We focus on non-GAAP tax rates, which we define as the tax rates applied to non-GAAP exclusions (hereafter, exclusions). Using detailed hand-collected data, we find that non-GAAP tax rates are systematically lower (higher) when exclusions are income-increasing (income-decreasing), leading to higher after-tax non-GAAP earnings. In addition, using GAAP effective tax rate (hereafter, GAAP ETR) and the statutory tax rate as proxies for the *non-discretionary* portion of the non-GAAP tax rate, we find robust evidence that managers opportunistically use non-GAAP tax rates to achieve after-tax non-GAAP earnings targets. Finally, we document that firm-reported after-tax non-GAAP earnings are less persistent for future GAAP earnings, compared to non-GAAP earnings calculated using GAAP ETR or the statutory tax rate. The lower persistence of firm-reported non-GAAP earnings implies that non-GAAP tax rates are sometimes too high or too low, thus contaminating the after-tax non-GAAP earnings with mostly transitory exclusion items.

1. Introduction

Non-GAAP earnings, also frequently referred to as "pro forma earnings," "street earnings," or "core earnings," are GAAP earnings adjusted for items at managers' discretion. Disclosing non-GAAP numbers has become a common practice. Over the last decade, both the number of firms reporting non-GAAP numbers and the magnitude of non-GAAP exclusions have increased (Bentley et al. 2018; Black et al. 2017). Bentley et al. (2018) report that over the period 2003 to 2012, the proportion of firms reporting non-GAAP metrics increased from 29% to 59%. In addition to firms' reporting of non-GAAP earnings, analysts and analyst-tracking services such as I/B/E/S and Zacks have also focused on non-GAAP numbers (Gu and Chen 2004; Doyle et al. 2013). In this study, we investigate a decision many firms have to make when disclosing after-tax non-GAAP earnings: the tax rate applied to non-GAAP adjustments (hereafter, the non-GAAP tax rate).[1]

When both GAAP and non-GAAP earnings are on an after-tax basis, firms need to adjust for the tax effects of exclusions.[2] As the magnitude of exclusions is increasing over time (Abarbanell and Lehavy 2007; Doyle et al. 2013; Bentley et al. 2018), the tax effect of the exclusions becomes a non-negligible component that directly affects after-tax non-GAAP earnings. In this study, we ask three questions: first, what tax rates do managers apply to exclusions? Second, does the choice of non-GAAP tax rates reflect manager opportunism? Third, to the extent that the choice of non-GAAP tax rates reflects manager opportunism, does it impair the informativeness of the reported after-tax non-GAAP earnings?

[1] "Non-GAAP adjustments," "adjustments," "non-GAAP exclusions," and "exclusions" are used interchangeably throughout the paper.

[2] We focus on firms that report non-GAAP earnings on an after-tax basis. If the non-GAAP earnings is a pre-tax number, for example, earnings before interest and tax (EBIT) or earnings before interest, tax, depreciation, and amortization (EBITDA), the entire tax expense line is excluded, and thus there is no discretion in selecting a non-GAAP tax rate.

We study non-GAAP tax rates for two main reasons. First, the calculation and presentation of the tax effect of exclusions have recently become one of the focus areas of the SEC. In 2010, the SEC Division of Corporation Finance issued the Compliance and Disclosure Interpretations (hereafter, C&DI) addressing common questions regarding the reporting of non-GAAP earnings. In May 2016 the SEC updated the C&DI and provided additional guidance on the use and disclosure of non-GAAP financial measures. Both versions specifically discuss how the tax effect of non-GAAP adjustments should be presented. The SEC requires that:

> "*A registrant should provide income tax effects on its non-GAAP measures… adjustments to arrive at a non-GAAP measure should not be presented net of tax. Rather, income taxes should be shown as a separate adjustment and clearly explained.*"

Over the period of 2010 to 2017, the SEC also issued a total of 140 comment letters requesting firms to disclose the tax effect of exclusions and how the tax effect is calculated. Despite the SEC's concern in this area, there is scant large sample evidence as to how firms report the tax effect. In our sample, we find that among the firms that disclose after-tax non-GAAP earnings, 42% do not separately present the tax effect of exclusions, i.e., exclusions are presented net of tax, or the tax effect is not mentioned at all. Even the firms that do disclose the tax effect of exclusions rarely explain how the tax effect is determined. In addition to the SEC's recent focus on non-GAAP tax rates, a glance at earnings conference calls also suggests that non-GAAP tax rates are frequently discussed and used by managers and analysts.[3]

Second, the decision as to what tax rates to apply to non-GAAP adjustments reflects unique cost-benefit tradeoffs compared to other GAAP or non-GAAP reporting decisions. When the

[3] For example, Microsoft Inc., in its Q3 2017 earnings call, stated that "our non-GAAP effective tax rate was approximately 23%." We note that non-GAAP tax rates might have a slightly different meaning in an earnings call setting. In earnings calls, non-GAAP tax rates usually refer to the effective tax rates applied to pre-tax non-GAAP earnings, while in our study non-GAAP tax rates refer to the tax rates applied to non-GAAP exclusions.

market has an expectation of what items are typically excluded (Gu and Chen 2004; Doyle et al. 2013), adding an exclusion item that was not previously excluded is likely to draw attention. Bentley et al. (2018) find that analysts do not always follow managers' non-GAAP definition, and so adding a new exclusion may not help the firm to meet analysts' expectations. In this case, adjusting the tax rates applied to *existing* exclusions is a less salient way to manipulate after-tax non-GAAP earnings. Moreover, managing the tax rates applied to exclusions does not require journal entries or justification with the auditor because non-GAAP numbers are not audited. Finally, manipulating non-GAAP tax rates will not affect the reported total or deferred tax expenses, so managers are less concerned about future reversals. The combination of the discretion that managers have in non-GAAP reporting, the complexity of tax accounting, and the seemingly low detection risk together create a suitable setting to study whether (and if so, the extent to which) managers use non-GAAP tax rates opportunistically.

Despite the prevalence of non-GAAP exclusions, there is no clear rule as to how the tax effect of exclusions should be calculated. As discussed in detail in Section 2.1, the instructions to Rule 11-02(b) of Regulation S-X suggest that normally, firms should calculate the tax effects of non-GAAP adjustments using the statutory tax rate. However, a review of SEC comment letters related to the topic reveals that the SEC often uses the firm's GAAP effective tax rate as the benchmark and asks firms for clarification when non-GAAP tax rates deviate from GAAP ETR.

Using hand-collected data from 2004 to 2014, we first provide evidence on the tax rates that firms apply to non-GAAP exclusions. We find that, on average, non-GAAP tax rates are not significantly different from GAAP ETR. The mean quarterly year-to-date GAAP ETR is 30% in our sample, and the mean non-GAAP tax rate is 31%. When we focus on firms that meet or beat analyst earnings expectations, we find that the non-GAAP tax rate is significantly lower (higher)

than the GAAP ETR in the subsample of firms with income-increasing (income-decreasing) exclusions. This univariate result provides preliminary evidence on managerial opportunism because a lower (higher) non-GAAP tax rate applied on income-increasing (decreasing) exclusions leads to higher after-tax non-GAAP earnings (see Appendix A for a simple numerical example).

To systematically evaluate whether managers use non-GAAP tax rates strategically to meet earnings targets, we separate the reported after-tax non-GAAP earnings into two components: the *nondiscretionary* component, calculated by applying the GAAP ETR or statutory tax rate to exclusions,[4] and a *discretionary* component, calculated as the difference between the reported non-GAAP earnings and the non-discretionary component. The discretionary component captures the effect of using a discretionary non-GAAP tax rate (i.e., a tax rate that differs from GAAP ETR or the statutory rate) on after-tax non-GAAP earnings. In the univariate analysis, we find that the discretionary component is on average positive, i.e., firms' use of a non-GAAP tax rate that differs from GAAP ETR or the statutory tax rate on average increases after-tax non-GAAP earnings. The discretionary component is even more positive among firms that meet or beat analysts' earnings forecasts. In multivariate analysis, controlling for factors that are shown to relate to firms' tendency to meet or beat earnings expectations in prior studies, we continue to find that the discretionary component increases the likelihood of meeting or beating analyst expectations. This result is robust to using multiple proxies for the non-discretionary non-GAAP tax rates and using alternative research designs.

According to the two C&DIs issued by the SEC in 2010 and 2016, when reporting the tax effect of exclusions, firms have two options. The first is to present each adjustment on a pretax basis and to present the tax effect in *one line* (hereafter, Type II disclosure). The second option is

[4] In Section 2.1, we discuss in more detail why GAAP ETR and the statutory tax rate can be used as proxies for non-discretionary non-GAAP tax rates.

to disclose the tax effect of *each* reconciling item parenthetically or in a footnote (hereafter, Type III disclosure).[5] We find that the main effect carries over to firm-quarters using both Type II and Type III disclosure formats. We also separate the non-GAAP exclusions into recurring and non-recurring exclusions following the classification scheme used in Black et al. (2017). Consistent with prior research, we find that most non-GAAP exclusions are non-recurring (e.g., Lougee and Marquardt 2004). In addition, we find that our main result is concentrated in the subsample where the majority (>50%) of exclusions are non-recurring. To the extent that the tax effects on non-recurring exclusions are more difficult for outsiders to unwind, managers have more opportunities and incentives to manipulate the tax rates applied to these exclusions.

In our final set of analysis, we investigate the extent to which the discretionary use of non-GAAP tax rates affects the earnings persistence implications of non-GAAP earnings. When the non-GAAP tax rate is too high or too low, a fraction of the largely transitory exclusion items flow into after-tax non-GAAP earnings, making it less persistent for future earnings. We find that firm-reported non-GAAP earnings are less persistent for one-year-ahead GAAP earnings compared to non-GAAP earnings calculated using GAAP ETR and the statutory rate, suggesting that the non-GAAP tax rates that managers choose reduces the informativeness of reported non-GAAP earnings, and re-computing non-GAAP earnings using GAAP ETR or the statutory rate could improve one's ability to forecast future earnings.

Our study makes three primary contributions. First, to our knowledge, this is the first study to investigate the tax rates firms apply to non-GAAP exclusions and whether such rates reflect managerial opportunism. The SEC C&DIs require companies to disclose the tax effects of exclusions (using either of two proposed approaches, which we discuss in Section 2.1) and to

[5] See Section 2.1 for a detailed discussion on Type II and Type III disclosure formats.

discuss how they calculate the tax effect. Despite the SEC's concern about firms not fully disclosing the tax effect of non-GAAP exclusions, there is a dearth of empirical evidence as to how firms comply with the guidance. We find that a nontrivial percentage of firms do not disclose the tax effect of non-GAAP adjustments. Among firms that do disclose the tax effect of exclusions, hardly any of them discuss how the tax effect is calculated. Given the complexity of accounting for income taxes and the amount of discretion that managers have in non-GAAP reporting, our study sheds light on whether regulators should mandate more detailed, standardized disclosure on the tax effect of non-GAAP exclusions.

Second, our study extends the literature on earnings management through tax and related accounts to a non-GAAP reporting setting. Various studies examine the opportunistic reporting of income tax expenses (Dhaliwal, Gleason, and Mills 2004; Schrand and Wong 2003; Krull 2004). However, the extant literature on accounting for income taxes is primarily focused on the balance sheet and income statement reporting of taxes (Graham, Raedy, and Shackelford 2012). Despite non-GAAP tax rates being used prevalently in earnings releases and earnings conference calls, non-GAAP tax rates and managerial incentives behind their use has received little attention from researchers. We argue that managing the non-GAAP tax rate could be an alternative earnings/perception management tool without many real consequences (e.g., no cash flow consequence and no accrual reversal) and with a low detection risk (e.g., it does not require firms to create a "new" exclusion item). Our results are consistent with managers indeed managing non-GAAP tax rates to meet earnings targets.

Finally, our study has implications for users of non-GAAP numbers, including investors, analysts, and regulators. When the non-GAAP tax rate deviates from GAAP ETR or the statutory rate, and when such deviation increases after-tax non-GAAP earnings, it raises a red flag about

managerial opportunism and the informativeness of the reported after-tax non-GAAP numbers. Given that tax effects take up about one-third of pretax numbers, users of non-GAAP numbers should pay closer attention to how non-GAAP tax rates are determined. Our earnings persistence test also suggests that re-computing non-GAAP earnings using GAAP ETR or the statutory rate can improve one's ability to forecast one-year-ahead GAAP earnings.

Our study is related to but differs from two contemporaneous studies. Donelson et al. (2017) examine whether analysts understand the earnings persistence implications of nonrecurring tax items. Our study is similar in that we both examine taxes in the non-GAAP reporting setting. However, our study focuses on the tax rate(s) that firms apply on all types of exclusion items, while Donelson et al. (2017) focus on the exclusion of nonrecurring tax items. Kaplan et al. (2018) examine whether firms reporting discontinued operations engage in classification shifting by moving tax expense (benefit) out of (into) continuing operations so that they can report higher after-tax earnings from continuing operations. Although our study and Kaplan et al. (2018) both look at tax rates applied to non-core items, we focus on the non-GAAP reporting setting while Kaplan et al. (2018) focus on classification shifting within the income statement.

The remainder of the paper is organized as follows. In the next section, we review the related literature and develop our hypotheses. Section 3 presents the research design. Section 4 presents the sample construction process and the empirical results. Section 5 concludes.

2. Background, Related Literature, and Hypothesis Development

2.1 Background

When non-GAAP earnings are presented on an after-tax basis, firms should adjust the exclusion items for their tax effects. Two issues arise here. First, how should firms *present* the tax effect of non-GAAP exclusions? Second, how should firms *determine* the tax effect?

For the first issue, before 2010, there were no strict guidelines on how the tax effects of non-GAAP exclusions should be presented. Often times, firms presented each exclusion item net of tax and did not separately disclose the tax effect associated with the exclusions. On January 11, 2010, the Division of Corporation Finance of the SEC published its Compliance and Disclosure Interpretations (C&DI) relating to non-GAAP financial measures, which provides guidance on how firms should present the tax effects of exclusions.[6] According to the C&DI, firms have two options when reporting the tax effect of exclusions. The first is to present the pretax or after-tax amount of each adjustment and to disclose the tax effect of each adjustment item parenthetically or in a footnote to the reconciliation. The other option is to present the tax effect in *one line* in the GAAP to non-GAAP reconciliation. In either case, firms should disclose how they calculated the tax effect. We provide examples of both types of disclosures in Appendix B.

What tax rates should firms use to compute the tax effect of non-GAAP adjustments? The SEC's C&DIs are silent on this issue. To our knowledge, the only guidance that prescribes how the tax effect of non-GAAP adjustment should be calculated is in the instructions to Rule 11-02(b) of Regulation S-X. According to Instruction (7):

> "*Tax effects, if any, of pro forma adjustments normally should be calculated at the statutory rate in effect during the periods for which pro forma condensed income statements are presented and should be reflected as a separate pro forma adjustment.*"[7]

Based on our review of SEC comment letters, we find that sometimes the SEC staff asks firms to explain why their non-GAAP rate differs from GAAP ETR, implying that GAAP ETR could also be the starting point when a firm decides what non-GAAP tax rate to use.[8] In our

[6] See: http://www.sec.gov/divisions/corpfin/guidance/nongaapinterp.htm
[7] https://www.law.cornell.edu/cfr/text/17/210.11-02
[8] For example, in a comment letter issued to TIBCO Software Inc., the SEC staff wrote, "*we note that you use a 28% tax rate, which differs from your GAAP tax rate. Please explain to us why you believe this non-GAAP tax rate is more appropriate and explain to us how this rate differs from your GAAP tax rate.*" (https://www.sec.gov/Archives/edgar/data/1085280/000000000006028191/0000000000-06-028191-index.htm)

subsequent analysis, where we need to compute the discretionary portion of the non-GAAP tax rate, we use both GAAP ETR and the statutory tax rate as a proxy for the non-discretionary portion.

Although conceptually the non-GAAP tax rate should approximate to GAAP ETR or the statutory tax rate, it could differ from the two tax rates for two main reasons. First, it is possible that managers strategically choose a higher or lower non-GAAP tax rate in order to arrive at their desired after-tax non-GAAP earnings. We formally examine this possibility in the subsequent analysis. Second, the exclusion may represent a permanent book-tax difference item. In this case, the exclusion is either nontaxable or nondeductible, and the tax rate applied to it should be zero.[9] For example, stock-based compensation expense is frequently excluded from non-GAAP earnings, especially after SFAS 123R (Barth et al. 2012). The compensation expense related to incentive stock options (ISOs) is nondeductible for tax purposes. Therefore, when companies exclude stock compensation expenses associated with ISOs, they do not need to adjust for tax effects. In Section 4.4.2 we discuss the implications of non-GAAP exclusions that reflect permanent book-tax differences and conduct robustness tests to make sure that our inferences are not affected by the presence of such exclusion items.

2.2 Related literature

Our study is related to several streams of literature. The first link is to the literature on non-GAAP reporting. On the one hand, managers disclose non-GAAP earnings that purge the effect of

In another comment letter, issued to Celanese Corporation on September 26, 2016, the SEC commented: "*we note your GAAP effective tax rate for the years ended 2015, 2014 and 2013 was 41%, 33% and 32%, respectively, and your non-GAAP effective tax rate for those years was 18%, 21% and 19%, respectively. Please explain to us how you calculate the income tax effects of your non-GAAP adjustments.*" (https://www.sec.gov/Archives/edgar/data/1306830/000000000016094590/filename1.pdf)

[9] Note that if the excluded item represents a *temporary* book-tax difference, the non-GAAP tax rate should still approximate the GAAP ETR or the statutory rate. The reason is that the tax effect of an exclusion item should include both current and deferred tax expense. See Question 102.11 of http://www.sec.gov/divisions/corpfin/guidance/nongaapinterp.htm

transitory items, so as to communicate their firms' fundamental performance. Bradshaw and Sloan (2002) and Bhattacharya et al. (2003) report that non-GAAP earnings are on average more value-relevant than GAAP earnings, implying that non-GAAP earnings provide information that is useful for the pricing of firms' fundamentals. Lougee and Marquardt (2004) show that firms provide non-GAAP numbers when the informativeness of their GAAP earnings numbers is low. On the other hand, prior studies also report that non-GAAP exclusions reflect managerial opportunism as exclusions are used to meet earnings targets (Doyle et al. 2003; Doyle et al. 2013; Abarbanell and Lehavy 2007). Because we are primarily interested in firms' noncompliance with regard to the tax adjustments of exclusion items, our argument below is more closely related to the managerial opportunism view. However, we acknowledge that the two views are not mutually exclusive.

The second link is to the literature that studies how tax rates and tax-related accounts are used to manipulate bottom-line earnings in order to beat earnings benchmarks. Dhaliwal et al. (2004) show that managers use their discretion over accrued tax expenses to meet or beat analysts' forecasts. In particular, managers lower their expected GAAP ETR in the fourth quarter to meet or beat analysts' consensus forecasts that otherwise would have been missed. Schrand and Wong (2003) report that firms lower their valuation allowances to meet or beat analysts' forecasts. In addition to the valuation allowance, prior studies show that other tax accounts such as the tax contingency reserve and permanently reinvested earnings are also used to meet or beat the analysts' forecasts (Gupta, Laux, and Lynch 2016; Krull 2004). The studies mentioned above investigate managerial discretion over taxes in a GAAP setting, i.e., journal entries are required, numbers are audited, and future reversal is expected. Managerial discretion over taxes in the non-GAAP reporting setting has so far received very little attention.

2.3 Hypotheses

We argue that managers have opportunities and incentives to manage non-GAAP tax rates for three reasons. First, prior studies find that the market partially understands the opportunistic nature of *pro forma* exclusions and discounts positive earnings surprises that are accompanied by exclusions (Doyle et al. 2013; Black et al. 2017). Gu and Chen (2004) argue that the existence of many exclusions are anticipated before the earnings announcement. This point is confirmed by Doyle et al. (2013):

> "*For many firms, the existence of upcoming unusual items is publicly known well before the earnings announcement. Often, a firm will issue a press release indicating the types of unusual items but not the actual amounts*."

Therefore, when the market has an expectation of items that are typically excluded (e.g., stock-based compensation expenses or restructuring charges), adding a new exclusion item is likely to draw attention and to be discounted by the market. In this case, instead of adding a new exclusion, managers could adjust the tax rates applied to the existing exclusions to affect the after-tax non-GAAP earnings. Second, manipulating the tax rates applied to exclusions does not require journal entries or extensive justification with the auditor because non-GAAP numbers are not audited. Third, manipulating non-GAAP tax rates will not affect the reported total or deferred tax expenses. Therefore, managers can influence the market's perception of their firms' core earnings without worrying about future reversals. In light of this, observing what tax rates managers apply to the existing exclusions will be a powerful setting in which to detect any opportunistic behavior.

When expenses are excluded from non-GAAP earnings, any accrued tax benefits associated with these expenses should also be excluded. Excluding expenses is income-increasing, but excluding tax benefits has the opposite effect. Therefore, managers have incentives to use a lower non-GAAP tax rate so that they can report higher after-tax non-GAAP earnings. On the other hand, when gains are excluded from non-GAAP earnings, i.e., non-GAAP adjustments are income-decreasing, managers may use their discretion and apply a higher non-GAAP tax rate.

These effects are likely to be stronger if such discretion allows managers to report a non-GAAP number that meets or beats analysts' consensus forecasts. This leads to our first hypothesis:

H1: The discretionary use of non-GAAP tax rates is associated with a higher likelihood of meeting or beating analysts' earnings forecasts.

Our hypothesis relies on a fairly mild assumption that the market is slow to unwind the actual tax effect of exclusions. With a nonzero percentage of inattentive market participants, we expect that on average managers have incentives to manipulate non-GAAP tax rates in order to influence market perceptions (Hirshleifer and Teoh 2003). Given the ample evidence of investor and analyst inattention and the complex nature of the tax account, we believe our assumption is reasonable. If market participants are able to filter out manager opportunism, we might not find the results predicted in H1.

When managers choose non-GAAP tax rates strategically, the tax rate could be too low (high) when non-GAAP adjustments are income-increasing (income-decreasing). For income-increasing adjustments, when the tax rate is too low, the reported after-tax non-GAAP earnings include a fraction of the (largely transient) adjustments. Similar logic applies to income-decreasing adjustments.[10] Prior studies show that exclusion items are on average nonrecurring and less persistent, so the discretionary use of non-GAAP tax rates likely contaminates the reported non-GAAP earnings with nonrecurring exclusions, making it less persistent. Our second hypothesis is stated as follows:

H2: The discretionary use of non-GAAP tax rates is associated with less persistent non-GAAP earnings.

[10] For example, a firm excludes an inventory write-down of $100 and the GAAP ETR is 35 percent. If the manager strategically applies a 20% non-GAAP tax rate on the $100 exclusion, there is a $15 (100 × 35% – 100 × 20%) inventory write-down included in the non-GAAP earnings.

3. Research Design

To test H1, for each firm-quarter, we first identify the non-discretionary portion of the non-GAAP tax rate. As described in Section 2.1, *ex ante*, we believe that firms either use the statutory rate or GAAP ETR as the starting point when choosing non-GAAP tax rates. *Ex post*, we find that 20% (21%) of firm-quarters use a non-GAAP tax rate that is within a ± 2% range of their GAAP ETR (statutory rate). This clustering around the GAAP ETR and/or statutory rate suggests that many firms do use the two tax rates as a benchmark when determining their non-GAAP tax rates. Hence, for each firm-quarter, we use the year-to-date GAAP ETR and the statutory tax rate as a proxy for the non-discretionary portion of non-GAAP tax rates.[11]

Using GAAP ETR and the statutory rate to proxy for the non-discretionary portion of non-GAAP tax rates, we calculate the *non-discretionary* portion of non-GAAP earnings as follows:

$$NG\_EARN_{ETR} = EARN + pretax\ exclusions \times (1 - GAAP\ ETR) - NonRecurTax$$
$$NG\_EARN_{STR} = EARN + pretax\ exclusions \times (1 - STR) - NonRecurTax$$

where *EARN* represents after-tax GAAP earnings, NG_EARN_{ETR} is the *non-discretionary* non-GAAP earnings calculated by applying GAAP ETR to pretax exclusions, and NG_EARN_{STR} is the *non-discretionary* non-GAAP earnings calculated by applying the statutory tax rate to pretax non-GAAP exclusions. Both versions of non-GAAP earnings are adjusted by nonrecurring tax items (*NonRecurTax*), i.e., one-time discrete tax items that directly flow into the tax expense line in the GAAP to non-GAAP reconciliation. Next, the effect of the *discretionary* non-GAAP tax rate on non-GAAP earnings can be expressed as:

$$\Delta NG\_EARN_{ETR} = NG\_EARN - NG\_EARN_{ETR}$$
$$\Delta NG\_EARN_{STR} = NG\_EARN - NG\_EARN_{STR}$$

[11] We use year-to-date GAAP ETR because quarterly ETR is more likely to be contaminated by one-time discrete tax items (see Bratten et al. 2017). We find qualitatively similar results using quarterly GAAP ETR or annual GAAP ETR. See Section 4.6: Robustness Checks.

where *NG_EARN* is the reported after-tax non-GAAP earnings, calculated as: *NG_EARN = EARN + pretax exclusions – total tax effect – NonRecurTax* where *EARN* represents after-tax GAAP earnings and *total tax effect* is the firm-disclosed tax effect on exclusions.

ΔNG_EARN_{ETR} and ΔNG_EARN_{STR} are our key variables of interest. A positive ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) suggests that the *actual* non-GAAP tax rate the firm uses *increases* non-GAAP income relative to the case where non-GAAP income is calculated using the GAAP ETR (statutory tax rate). ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) is a function of both the discretionary non-GAAP tax rate and the magnitude of total non-GAAP adjustments. When non-GAAP adjustments are income-increasing (i.e., expenses are excluded), applying an abnormally low tax rate on adjustments increases the reported after-tax non-GAAP earnings, and vice versa (see Appendix A for a numerical example).

We adopt the following model from Doyle et al. (2013) to test H1:

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{ETR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1a)$$

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{STR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1b)$$

In Equations (1a) and (1b), we use a probit model to estimate whether the discretionary use of non-GAAP tax rates (ΔNG_EARN_{ETR} or ΔNG_EARN_{STR}) is related to the likelihood of meeting or beating analysts' forecasts. *MBE* is a binary variable that equals one when the firm's reported non-GAAP earnings meet or beat the consensus analyst forecast in quarter *t*, and zero otherwise. A positive β_1 is consistent with H1 that the discretionary use of non-GAAP tax rates increases the firm's chance to meet or beat analyst consensus. We also control for the amount of total pretax exclusions (*Total_ADJ*) so that the coefficient on ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) captures only the discretionary tax rate effect. We expect β_2 to be positive. In addition, we include a set of controls that prior studies have shown to be correlated with a firm's tendency to meet or beat

analysts' forecasts. These variables include book-to-market ratio, sales growth, size, and return on assets (Doyle et al. 2013).[12]

To test whether the discretionary use of non-GAAP tax rates contaminates the reported after-tax non-GAAP earnings, making it less persistent (H2), we estimate the following equations:

$$EARN_{it+4} = \beta_0 + \beta_1 NG\_EARN_{it} + \varepsilon_{it+4} \quad (2a)$$

$$EARN_{it+4} = \beta_0 + \gamma_1 NG\_EARN_{ETRit} + \gamma_2 \Delta NG\_EARN_{ETR\ it} + \varepsilon_{it+4} \quad (2b)$$

$$EARN_{it+4} = \beta_0 + \gamma_1 NG\_EARN_{STRit} + \gamma_2 \Delta NG\_EARN_{STR\ it} + \varepsilon_{it+4} \quad (2c)$$

where $EARN_{t+4}$ is the same quarter *one-year-ahead* GAAP earnings for firm *i* in quarter *t*. Here we are primarily interested in earnings persistence with respect to future GAAP earnings (rather than future non-GAAP earnings), because if managers persistently use non-GAAP tax rates strategically, they will be able to report a series of self-predictable non-GAAP earnings. In Equation (2a), NG_EARN_{it} is the current quarter's reported non-GAAP earnings. To the extent that non-GAAP earnings capture persistent "core" earnings, β_1 should be positive. In Equations (2b) and (2c), we separate *NG_EARN* into a non-discretionary component, NG_EARN_{ETR} (NG_EARN_{STR}), and a discretionary component, ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}). The discretionary component, ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}), measures the effect of using a *discretionary* non-GAAP tax rate on non-GAAP earnings. H2 predicts that, by applying a discretionary non-GAAP tax rate on exclusions, managers include a fraction of the largely transitory non-GAAP adjustments in the reported after-tax GAAP earnings. Hence, the reported non-GAAP earnings should be less persistent than non-GAAP earnings computed using a nondiscretionary non-GAAP tax rate, i.e., $\beta_1 < \gamma_1$. In addition, we expect Eq. (2a) to have lower explanatory power relative to Eq. (2b) and (2c).

[12] Doyle et al. (2013) also include an indicator variable coded one if the firm is profitable. However, we note that because we require the availability of GAAP ETR for most of our tests, our sample is limited to firms with pre-tax profits.

4. Sample and Empirical Results

4.1 Sample construction

Regulation G, implemented by the SEC in March 2003, mandates that if a firm discloses non-GAAP earnings to the public, it must also disclose the most directly comparable GAAP earnings and prepare a reconciliation of the non-GAAP metric to the GAAP metric. With the implementation of Regulation G, firms also must file 8-Ks for earnings announcements. Hence, we rely on 8-Ks to identify non-GAAP exclusion items and the tax effects of non-GAAP exclusions. To build the hand-collection sample, we first obtain an index dataset from WRDS SEC Analytics Suite. The index dataset contains the identifying information (e.g., firm identifier, filing type, and url) of all filings available on EDGAR since 1994. Restricting the form type to "8-K", and item number "2.02" ("Results of Operations and Financial Condition"), we begin our sample construction with 201,715 observations between 2004 and 2014. We then use the SEC Analytics Suite to remotely parse Form 8-Ks. We retain 8-Ks that discuss non-GAAP performance metrics and tax-related words. This step yields a sample of 18,219 Form 8-Ks that are candidates for hand-collection.[13]

We identify three types of disclosure formats for the tax effect of non-GAAP adjustments. We provide an example of each type in Appendix B. Under "Type I" disclosure (see Appendix B, Example 1), firms disclose all adjustments net of tax and do not separately report the tax effect of adjustments. As an outsider, there is no way of knowing the tax effect of these adjustments. The SEC is concerned about this lack of tax effect disclosure and explicitly forbids firms from doing so in the two C&DIs issued in 2010 and 2016. The SEC also sent comment letters to firms that

[13] We identify 8-K that discuss non-GAAP performance metrics using the following keywords: "non-gaap" or "non gaap" or "pro forma" or "pro-forma" or "reconcil."

reported non-GAAP adjustments "net of tax."[14] We find that 14.9% of firm-quarters (2,715 out of 18,219) provide "net of tax" disclosure.

Under "Type II" disclosure (see Appendix B, Example 2), firms present all pretax non-GAAP adjustment items first, and then present the total tax effect of these adjustments. For firms using this disclosure format, we can compute the overall tax rate applied to non-GAAP adjustments. However, we cannot work out the tax rate applied to each adjustment item. We find 1,335 firm-quarters that use the Type II disclosure format. Under "Type III" disclosure (see Appendix B, Example 3), for each exclusion item, the firm presents the amount of adjustment and the tax effect. Alternatively, the firm presents both pretax and after-tax adjustment amounts, so users can work out the "tax effect" on a particular adjustment item. This type of disclosure provides the most detailed information regarding the tax rates firms apply to non-GAAP adjustments. We can calculate the overall non-GAAP tax rate, as well as the tax rate applied to each adjustment item. We find 2,446 firm-quarters that use the Type III disclosure format.

Because our research design requires us to quantify the non-GAAP tax rate, only those firm-quarters using Type II or Type III disclosure formats enter our test sample. For every firm-quarter observation, we manually code 14 non-GAAP exclusion items. The 14 categories are chosen based on our review of typical non-GAAP exclusions from an initial random sample of 100 observations, the I/B/E/S Manual, and prior non-GAAP studies that hand-collect exclusions (e.g., Black et al. 2017; Bentley et al. 2018; Brown et al. 2017).[15] In addition, we create a 15th

[14] For example, in a comment letter issued to Dole Foods on March 9, 2012, the SEC wrote, "*We note that the adjustments to income (loss) from continuing operations to arrive at comparable income (loss) from continuing operations, are shown net of income taxes. Please tell us how you determine the income tax effects on these adjustments and confirm to us that you will provide such disclosure in the future.*"
https://www.sec.gov/Archives/edgar/data/18169/00000000012012405/0000000000-12-012405-index.htm

[15] https://wrds-web.wharton.upenn.edu/wrds/support/Data/_001Manuals%20and%20Overviews/_003I-B-E-S/_001IBES%20Estimates/Data%20Manuals/_020TF%20Methodology%20for%20Estimates%20October%202009.pdf.cfm

category for "other" adjustments. The 15 categories are: (1) restructuring costs; (2) acquisition-related; (3) depreciation and amortization; (4) asset writedown; (5) litigation-related; (6) stock compensation; (7) debt extinguishment; (8) foreign currency exchange; (9) *non-recurring tax items*;[16] (10) discontinued operations; (11) change in fair value; (12) pension-related; (13) gains and losses from asset sale; (14) inventory step-up; (15) other.

For each type of adjustment, we collect the amount of the adjustment, and the tax effect of the adjustment if available. Among the 15 categories of adjustments, non-recurring tax items is special in the sense that it is an adjustment that directly affects the income tax provision. Non-recurring tax items typically include one-time tax charges (benefits) resulting from settlements, foreign earnings repatriations, UTB adjustments, etc. Because these one-time tax expense (benefit) exclusions directly flow into the tax expense line in the non-GAAP reconciliation table, it is impractical to calculate a non-GAAP tax rate on this item (a detailed discussion on non-recurring tax items can be found in Donelson et al. 2017 and Bratten et al. 2017).

4.2 Descriptive statistics of non-GAAP tax rates

We compute the non-GAAP tax rate, i.e., the tax rate that firms apply to non-GAAP exclusions, as follows. We first sum up the total pretax adjustment amount (excluding non-recurring tax items). For firm-quarters using the Type II disclosure format, the non-GAAP tax rate is calculated as the total tax effect of exclusions divided by the total pretax exclusion amount. Using Hewlett-Packard in Appendix B as an example, the total pretax non-GAAP adjustment = (424 + 235 + 51) = $710 million. The tax effect is $184 million. For Hewlett-Packard, the non-GAAP tax rate is 184/710 = 26%.[17]

[16] Throughout the paper nonrecurring tax items and discrete tax items are used interchangeably.
[17] For Type II disclosure, if the firm also excludes discrete tax items (in addition to adjusting for the tax effects of non-GAAP exclusions), we carefully make sure that we do not include the discrete tax item in our calculation of non-

For firm-quarters using the Type III disclosure format, we first sum up the tax effects on all 14 adjustment items (excluding nonrecurring tax items), and divide this total tax effect by the total pretax adjustment amount. Using Analogic Corporation in Appendix B as an example, the total pretax non-GAAP adjustment = (2.644 + 0.075 + 0.741) = $3.46 million. Total tax effect = (2.644 – 1.821) + (0.075 – 0.049) + (0.741 – 0.478) = $1.112 million. The non-GAAP tax rate is 1.112/3.46 = 32%. We winsorize non-GAAP tax rates at 1% tails.[18]

Table 2, Panel A presents the descriptive statistics of non-GAAP tax rates. For firm-quarters that use the Type II disclosure format, the mean (median) non-GAAP tax rate is 31.4% (32.1%), and for firm-quarters that use the Type III disclosure format, the mean (median) non-GAAP tax rate is 30.7% (32.8%). The mean non-GAAP tax rates for Type II and Type III observations are not significantly different. Panel A also presents the non-GAAP tax rates for subsamples with income-increasing and income-decreasing exclusions. Consistent with prior findings that firms use non-GAAP metrics to report better "core" earnings (Bradshaw and Sloan 2002; Bhattacharya et al. 2003), we have far more observations with income-increasing exclusions than observations with income-decreasing exclusions (2,298 versus 416). We find that the mean non-GAAP tax rate is 38.5% for firm-quarters with income-decreasing exclusions, and 29.6% for firm-quarters with income-increasing exclusions. Assuming that income-increasing and income-decreasing exclusions include a similar composition of different exclusion items, the tax rate applied to both types of exclusions should be similar. The lower rate applied to income-increasing

GAAP tax rates by reading the footnotes to the GAAP to non-GAAP reconciliation table. In Table 2 Panel A, the distribution of the non-GAAP tax rate for Type II disclosure is similar to that of Type III disclosure, suggesting that the possible presence of discrete tax items does not raise data quality concerns for the Type II disclosure subsample. In robustness tests (Section 4.6), we exclude Type II observations that may have discrete tax items (identified using the approach in Bratten et al. 2017) and our main results are unaffected.

[18] Unlike GAAP or cash effective tax rates which are undefined if the pretax income is zero or negative, non-GAAP tax rates are defined when the denominator (total non-GAAP exclusions) is positive or negative. In addition, we carefully verify that non-GAAP tax rates falling out of the (0,1) range do not represent data errors, so we choose to winsorize non-GAAP tax rate at 1% tails to reduce the effect of outliers, rather than winsorize it arbitrarily at (0,1).

exclusions provides some preliminary evidence of manager opportunism, i.e., applying a lower (higher) rate to positive (negative) exclusions, so that after-tax non-GAAP earnings are higher.

In Table 2 Panel B, we report the mean non-GAAP tax rate on each type of non-GAAP exclusions (using Type III observations). The non-GAAP tax rate varies between 25.8% (on mergers and acquisitions) and 38.9% (on pension-related adjustments). The cross-item variation in non-GAAP tax rates can be used to identify whether the exclusion item represents a permanent book-tax difference. We revisit Table 2 Panel B in Section 4.4.2.

4.3 Descriptive statistics of variables used in testing H1 and H2

Table 3 reports descriptive statistics for variables used in testing H1 and H2. Our first hypothesis concerns whether managers use non-GAAP tax rates strategically to meet or beat analyst consensus forecasts. As described in Section 3, we first compute the effect of using a non-GAAP tax rate that differs from GAAP ETR or the statutory rate on after-tax non-GAAP earnings (ΔNG_EARN_{ETR} and ΔNG_EARN_{STR}). We use year-to-date GAAP ETR and the statutory tax rate as proxies for the non-discretionary portion of non-GAAP tax rates. ΔNG_EARN_{ETR} and ΔNG_EARN_{STR} are multiplied by 100 for ease of presentation. The mean values of ΔNG_EARN_{ETR} and ΔNG_EARN_{STR} are positive, suggesting that the use of a non-GAAP tax rate that differs from GAAP ETR or statutory rate on average increases after-tax non-GAAP earnings. Over 60% of firm-quarters meet or beat analyst consensus, consistent with prior research (e.g., Doyle et al. 2013). The mean non-GAAP exclusion scaled by total assets (*Total_ADJ*) is positive, suggesting that on average non-GAAP adjustments are income-increasing (e.g., Bradshaw and Sloan 2002; Bhattacharya et al. 2003). The distribution of the control variables (book-to-market, ROA, sales growth, and size) are generally comparable with prior studies.

In Table 3 Panel B, we divide our sample into four subsamples, based on the sign of non-GAAP exclusions and whether the firm-quarter meets or beats the analyst consensus. For firm-quarters with income-increasing (income-decreasing) exclusions, MBE = 1 observations have significantly lower (higher) non-GAAP tax rate compared to MBE = 0 observations. As illustrated in Appendix A, applying a lower (higher) non-GAAP tax rate on income-increasing (income-decreasing) exclusions increases after-tax non-GAAP earnings. We also compare ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) for firm-quarters that meet or beat analysts' consensus and firm-quarters that fail to meet or beat. If the discretionary use of non-GAAP tax rates helps firms meet analysts' expectations, ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) should be larger for MBE = 1 firm-quarters. This is indeed the case. For both ΔNG_EARN_{ETR} and ΔNG_EARN_{STR}, the mean values are significantly greater in the MBE = 1 subsample than in the MBE = 0 subsample (with the exception of ΔNG_EARN_{STR} in the exclusions < 0 subsample).

We also compare year-to-date GAAP ETR with non-GAAP tax rates in the four 2×2 scenarios. For firm-quarters with income-increasing exclusions (Exclusions > 0), the non-GAAP tax rate is significantly lower than GAAP ETR when MBE = 1, and insignificantly different from GAAP ETR when MBE = 0. For firm-quarters with income-decreasing exclusions (Exclusions < 0), the non-GAAP tax rate is significantly higher than GAAP ETR when MBE = 1, and insignificantly different from GAAP ETR when MBE = 0. To the extent that GAAP ETR is the "correct" rate to use, Panel B provides preliminary evidence that firms use non-GAAP tax rates opportunistically, i.e., apply a low (high) tax rate to income-increasing (income-decreasing) exclusions.

Table 3 Panel C presents correlations for variables used in our main regressions. As expected, the magnitude of total non-GAAP exclusions (*Total_ADJ*) is positively associated with

the likelihood of meeting or beating analysts' consensus forecasts (*MBE*). In addition, the effect of discretionary non-GAAP tax rates on non-GAAP earnings (ΔNG_EARN_{ETR} and ΔNG_EARN_{STR}) is also positively associated with meeting or beating. The correlations between meeting or beating (*MBE*) and control variables in Eq. (1a) and (1b) are generally consistent with prior research. For example, more profitable (*ROA*) and higher growth (*Sales_Growth*) firms are more likely to meet or beat (Doyle et al. 2013). We do not find a significant correlation between meeting or beating and firm size and book-to-market ratio.

4.4 Testing H1

4.4.1 Testing H1: main results

In Table 4, we estimate Eq. (1a) and (1b) controlling for factors that prior studies show are associated with meeting or beating analysts' earnings expectations. In Column 1, ΔNG_EARN_{ETR} is calculated using GAAP ETR as the proxy for the non-discretionary non-GAAP tax rate. In Column 2, the statutory tax rate is used to proxy for non-discretionary non-GAAP rate and the variable of interest is ΔNG_EARN_{STR}. We see that the coefficients on both ΔNG_EARN_{ETR} and ΔNG_EARN_{STR} are positive and significant, suggesting that the discretionary use of a non-GAAP tax rate that differs from GAAP ETR or the statutory rate increases the likelihood of meeting or beating analysts' consensus. The total non-GAAP exclusion (*Total_ADJ*) is also strongly positively associated with the likelihood of meeting or beating, consistent with prior research. Because we control for pre-tax total non-GAAP exclusions (*Total_ADJ*), our ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) variable captures only the incremental effect of discretionary non-GAAP tax rates.

We also employ an alternative model specification used in prior research to examine whether firms use their discretion in non-GAAP tax rates to meet or beat analysts' earnings

forecasts. Following Dhaliwal et al. (2004) and Krull (2004), we estimate the following model using OLS regression:

$$\Delta NG\_EARN_{ETRit} = \beta_0 + \beta_1 MissAmount_{it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (3a)$$
$$\Delta NG\_EARN_{STRit} = \beta_0 + \beta_1 MissAmount_{it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (3b)$$

where *MissAmount* is the consensus analyst forecast minus non-GAAP earnings calculated using GAAP ETR or the statutory rate, multiplied by the number of shares used to calculate diluted EPS and scaled by total assets. A positive *MissAmount* indicates that the pre-managed non-GAAP earnings fall short of the earnings target. *MissAmount* is set to zero if pre-managed non-GAAP earnings meet or beat the earnings target. We expect β_1 to be positive, i.e., if pre-managed non-GAAP earnings fall short of analyst consensus, managers have incentives to use non-GAAP tax rates strategically to increase the reported after-tax non-GAAP earnings.

Results are presented in Table 5. In Column 1, GAAP ETR is used as a proxy for the non-discretionary non-GAAP tax rate. In Column 2, the statutory tax rate is used as a proxy for the non-discretionary non-GAAP tax rate. The coefficient on *MissAmount* is positive and significant in both columns, suggesting that managers use non-GAAP tax rates to report higher after-tax non-GAAP earnings when the pre-managed non-GAAP earnings fall short of earnings targets.

4.4.2 Discussion on permanent book-tax differences

One concern about our analysis above is that the exclusion items might be treated differently for book and tax purposes. If an exclusion is treated as a gain (loss) for book purposes but not taxable (deductible) for tax purposes, the non-GAAP tax rate applied to it should be zero. For such exclusions, the firm's GAAP ETR is no longer a good benchmark for the non-GAAP tax rate, and neither is the statutory tax rate. We address and discuss this issue from two aspects.

First, for the subsample of firms that use the Type III disclosure format, we compute the average non-GAAP tax rate applied to each type of exclusion item. We assume that firms treat

exclusions in a similar way, i.e., if an item represents a permanent book-tax difference, most firms in the sample apply a zero tax rate on it. By observing the cross-item variation in non-GAAP tax rates, we can *ex post* identify which items are likely to represent permanent book-tax differences. Table 2, Panel B reports the mean and median values of the non-GAAP tax rate applied to each type of exclusion. Although there is some cross-item variation, the mean (median) values of non-GAAP tax rates are 25.8% (29.2%) or higher, suggesting that the exclusion items are not treated as permanent book-tax differences by most firms in our sample.

Second, firms are required to prepare a reconciliation between GAAP ETR and the statutory tax rate in the income tax footnote. The reconciliation table summarizes the main sources of permanent book-tax differences. We identify a list of common permanent book-tax differences from Drake et al. (2017). Drake et al. (2017) hand-collect ETR reconciliation disclosures from a large set of firms and classify the reconciliation items into 23 categories. We compare our list of exclusion items with their list of permanent book-tax difference items. We find that there is only a small amount of overlap between the two lists. Items that appear in both lists include: asset write-down ("intangible and goodwill effect" in Drake et al. 2017), stock compensation ("stock option"), and M&A ("M&A effect"). From Panel B of Table 2, we see that the mean non-GAAP tax rates on asset writedown, stock compensation, and M&A are 0.27, 0.28, and 0.26, respectively. Compared to non-GAAP rates on other exclusion items, these three items indeed have lower non-GAAP tax rates (although not as low as zero).

In Table 6, we drop firm-quarters that exclude at least one of the three items: asset write-down, stock compensation, and M&A. We then re-estimate Eq. (1a) and (1b). Because the three items are fairly common non-GAAP exclusions, our sample size decreases significantly to 1,372 firm-quarters. The coefficient on ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) continues to be positive and

significant, mitigating the concern that the existence of permanent book-tax difference items drives our main results.

4.4.3 Testing H1: subsample analysis by disclosure type

We perform a subsample analysis based on *how* firms disclose the tax effect of non-GAAP adjustments. As discussed earlier, some firms disclose the tax effect of non-GAAP adjustments as a lump sum (Type II disclosure; see Appendix B Example 2), while some separately disclose the tax effect of each line item adjustment (Type III disclosure; see Appendix B Example 3). Most firms use the Type III format. We conjecture that firms that use non-GAAP tax rates strategically have incentives to provide fewer details. Hence, we expect the main effect to concentrate in the Type II disclosure subsample. We estimate Equations (1a) and (1b) separately for Type II and Type III observations and the results are reported in Table 7.

The main result carries over to both subsamples. The coefficients on ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) are positive and significant in all columns. The coefficients are not significantly different across the subsamples, so we fail to find evidence that the main effect is more pronounced in the Type II subsample. This test attempts to distinguish the different managerial incentives behind Type II and Type III disclosures. We note that firms that do not disclose the tax effect of non-GAAP exclusions at all are the most likely to behave strategically. However, we are unable to test this conjecture due to the lack of disclosure.

4.4.4 Testing H1: subsample analysis by the relative magnitude of recurring versus nonrecurring exclusions

Doyle et al. (2003) find that non-special item exclusions are associated with future cash flows, and excluding such recurring items reflects greater manager opportunism. We examine whether the main effect varies depending on the relative magnitude of recurring versus

nonrecurring exclusions. We follow Black et al. (2017) and classify the 14 non-GAAP adjustments as recurring versus non-recurring.[19] Consistent with Lougee and Marquardt (2004), who find that firms are more likely to report non-GAAP earnings when they have non-recurring items, in our sample (which consists only of firms that report non-GAAP earnings), the magnitude of non-recurring items is much larger than that of recurring items. For 75% (=2,022/2,714) of our sample, the magnitude of nonrecurring exclusions is greater than 50% of total exclusions.

We estimate Eq. (1a) and (1b) separately for two subsamples: (1) the magnitude of non-recurring items exceeds 50% of total adjustments; (2) the magnitude of non-recurring items is less than 50% of total adjustments. We find that our main result is concentrated in the subsample where the majority of non-GAAP adjustments are nonrecurring. Hence, although excluding recurring items reflects greater managerial opportunism (Doyle et al. 2003), in our setting we only find evidence of opportunism when firms exclude more nonrecurring items. One explanation is that it is more difficult for outsiders to evaluate the tax effect of nonrecurring items, so for managers, it is less costly to manipulate the tax rates applied to such items. Another explanation is that, analysts do not always follow managers' non-GAAP reporting choice (e.g., Bentley et al. 2018). For example, Gu and Chen (2004) find that analysts have expertise in identifying items (excluded by managers) that are likely to persist and include such items in their earnings forecasts. Hence, if managers exclude recurring items while the analysts (and IBES) do not exclude recurring items, manipulating tax rates applied to recurring items will not help the firm meet or beat expectations.

Overall, our analysis suggests that the discretionary use of non-GAAP tax rates on average increases firms' reported non-GAAP earnings and the likelihood of meeting or beating analysts'

[19] Non-recurring items include restructuring charges, acquisition-related, asset impairments and writedowns, litigation-related, debt extinguishment, discontinued operations, gains and losses from assets, and other items. Recurring items include depreciation and amortization, stock compensation, foreign currency exchange, fair value adjustment, pension-related, and inventory step-up.

earnings expectations. This effect holds for both types of disclosure formats and is concentrated among firms for which the majority of non-GAAP exclusions are nonrecurring.

4.5 Testing H2: discretionary non-GAAP tax rates and earnings persistence

H2 predicts that, if firms use non-GAAP tax rates strategically, the tax rate applied to non-GAAP adjustments could be too high or too low. Hence, the reported after-tax non-GAAP earnings contain a fraction of the transitory exclusion items and will thus be less persistent for future performance. We estimate Eq. (2a) – (2c) and report the results in Table 9. Column (1) reports results estimating Eq. (2a), and Columns (2) and (3) report results estimating Eq. (2b) and (2c) using GAAP ETR and the statutory rate as proxies for non-discretionary non-GAAP tax rates. H2 predicts that $\beta_1 < \gamma_1$, i.e., the reported non-GAAP earnings are less persistent compared to non-GAAP earnings calculated using GAAP ETR or the statutory rate. If the discretionary use of non-GAAP tax rates makes non-GAAP earnings less informative, we also expect the explanatory power of Eq. (2a) to be lower compared to Eq. (2b) and (2c).

In Column (1), the coefficient on the current quarter's reported non-GAAP earnings is positive and significant (β_1 = 0.531***), consistent with prior research that non-GAAP earnings capture "core" earnings that are persistent. In Column (2), we separate the reported non-GAAP earnings into two components, NG_EARN_{ETR}, calculated by applying GAAP ETR to exclusions, and ΔNG_EARN_{ETR}, calculated as the difference between the reported non-GAAP earnings (*NG_EARN*) and NG_EARN_{ETR}. The coefficient on NG_EARN_{ETR} (γ_1) is 0.563, and is significantly greater than β_1 in Eq. (2a). The Vuong test also suggests that separating non-GAAP earnings into two components improves the model's explanatory power, i.e., the adjusted R-squared of Eq. (2b) is significantly greater than that of Eq. (2a).

In Column (3), we repeat the analysis in Column (2) but use the statutory rate to proxy for the non-discretionary non-GAAP tax rate. The coefficient on NG_EARN_{STR} is 0.583, and is significantly greater than β_1 in Eq. (2a). The improvement in explanatory power (0.292 versus 0.265) is also statistically significant. Overall, the earnings persistent test is consistent with H2 that non-GAAP tax rates used by managers are too high or too low relative to GAAP ETR and the statutory rate, thus causing some transitory exclusion items to be included in the reported non-GAAP earnings, making it less persistent.

4.6 Robustness checks

Use annual and quarterly GAAP ETR as proxies for the non-discretionary non-GAAP tax rate. In our main analysis, we use the year-to-date GAAP ETR as a proxy for the non-discretionary non-GAAP tax rate. We choose year-to-date GAAP ETR because it represents the information that managers have when making non-GAAP adjustments (compared to annual GAAP ETR), and it is less likely to be contaminated by discrete tax items recognized in the quarter (compared to quarterly GAAP ETR). In Table 10 Panel A, we re-estimate Eq. (1a) and (1b) using annual and quarterly GAAP ETRs as alternative proxies for the non-discretionary non-GAAP tax rate. Results are qualitatively similar.

Exclude Type II firms with discrete tax items. If managers adjust for discrete tax items when reporting non-GAAP earnings, the discrete tax items directly flow into the income tax adjustment line for firms that use the Type II disclosure format (i.e., firms that disclose the tax effect on all non-GAAP exclusions as a lump sum, see Appendix B Example 2). We read non-GAAP reconciliation footnotes carefully to make sure that discrete tax items do not enter our calculation of non-GAAP tax rates for Type II firms. However, to further ensure that our results are not driven by firms with discrete tax items, we drop firm-quarters using Type II disclosure and at the same

time reporting discrete tax items.[20] Results are reported in Table 10 Panel B. Our sample size decreases from 2,714 to 2,253, and all inferences remain similar.

5. Conclusion

In this study, we investigate a decision many firms have to make when disclosing non-GAAP earnings – the tax rate applied to non-GAAP adjustments. The calculation and presentation of the tax effect of non-GAAP exclusions have recently become one of the focus areas of the SEC. The SEC Division of Corporation Finance issued and updated the Compliance and Disclosure Interpretations (C&DIs) in 2010 and 2016. Both C&DIs require companies to clearly present and explain the tax effects of non-GAAP adjustments. Since 2010, the SEC has also issued 140 comment letters requesting firms to provide additional details on the tax effects of non-GAAP exclusions.

Consistent with the SEC's concern in tax reporting in the non-GAAP setting, we find that a nontrivial amount of firms do not clearly present the tax effect of non-GAAP adjustments. In addition, firms that do disclose the tax effects rarely explain how they determine the non-GAAP tax rates. We hypothesize that managers face unique cost-benefit tradeoffs when deciding on their non-GAAP tax rates due to the complexity of the tax account and the discretionary nature of non-GAAP reporting in general. We find robust evidence that the use of discretionary non-GAAP tax rates increases firms' chances of meeting or beating analysts' earnings forecasts. This result holds for both types of disclosure formats (Type II and III). To the extent that it is more difficult for outsiders to unwind the tax effect of nonrecurring exclusions, it is less costly for managers to

[20] To identify firms with discrete tax items, we follow the approach in Bratten et al. (2017). For firm *i* in quarter *q*, we first compute the GAAP ETR (*txtq*/*piq*), and we obtain the IBES actual tax rate from IBES Actuals (the actu_xepsus file). We compare the quarterly GAAP ETR with the IBES actual tax rate. If the difference between the two tax rates is within ±1%, we conclude that there are no discrete tax items for the quarter.

manipulate non-GAAP tax rates when the majority of exclusions are non-recurring. We find that the main result is concentrated among firms with more nonrecurring non-GAAP exclusions. Finally, we find that the reported non-GAAP earnings are less persistent for one-year-ahead GAAP earnings compared to non-GAAP earnings calculated using GAAP ETR or the statutory rate. The lower persistence of the reported non-GAAP earnings suggests that the discretionary use of non-GAAP tax rates causes a fraction of the largely transitory non-GAAP adjustments to flow into the reported after-tax non-GAAP earnings, making it less informative.

Our study provides the first large sample evidence on the use and reporting of non-GAAP tax rates. Our study is of interest to the SEC, as well as users of non-GAAP information, including analysts, investors, and researchers. Our findings suggest that a discrepancy between non-GAAP tax rates and GAAP ETR (or the statutory rate) may raise a red flag about managerial opportunism and the informativeness of the reported after-tax non-GAAP numbers. Given the updated Compliance and Disclosure Interpretations in 2016 and the increasing volume of SEC comment letters that request firms to improve their disclosure of non-GAAP tax rates, future research can explore the time-series change in firms' reporting behavior in this area.

Appendix A: Non-GAAP tax rate and income-increasing (income-decreasing) exclusions

Non-GAAP exclusions are income-increasing

A firm reports "core" earnings of $100, and a restructuring charge of $50, GAAP total tax expense of $15. The GAAP ETR is 15/(100-50) = 30%. The GAAP net income is $100 – 50 – 15 = $35. The table below compares two scenarios. In Scenario 1, the firm applies a **30%** tax on non-GAAP exclusions (i.e., the restructuring charge). In Scenario 2, the firm applies a **25%** tax rate on non-GAAP exclusions.

	1. Non-GAAP tax rate = GAAP ETR = **30%**	2. Non-GAAP tax rate = **25%** < GAAP ETR
Net GAAP income	$35	$35
Add:		
Pretax restructuring charge	$50	$50
Subtract:		
Tax effect on restructuring	$15 (50*30%)	$12.5 (50*25%)
After-tax non-GAAP income	$70 (35 + 50 – 15)	$72.5 (35 + 50 – 12.5)

Non-GAAP exclusions are income-decreasing

A firm reports "core" earnings of $100, and gain from asset sale of $50, GAAP total tax expense of $45. The GAAP ETR is 45/(100+50) = 30%. The GAAP net income is $100 + 50 – 45 = $105. The table below compares two scenarios. In Scenario 1, the firm applies a **30%** tax on non-GAAP exclusions (i.e., the gain from asset sale). In Scenario 2, the firm applies a **35%** tax rate on non-GAAP exclusions.

	1. Non-GAAP tax rate = GAAP ETR = **30%**	2. Non-GAAP tax rate = **35%** > GAAP ETR
Net GAAP income	$105	$105
Subtract:		
Pretax gain from asset sale	$50	$50
Add:		
Tax effect on gain from asset sale	$15 (50*30%)	$17.5 (50*35%)
After-tax non-GAAP income	$70 (105 – 50 + 15)	$72.5 (105 – 50 + 17.5)

Appendix B: Examples of the tax adjustment on exclusion items

Example 1: Type I disclosure (non-GAAP exclusions are presented "net-of-tax")
https://www.sec.gov/Archives/edgar/data/15615/000119312513196408/d530459dex991.htm

MasTec Inc.
Reconciliation of Non-GAAP Disclosures and Supplemental Disclosures-Unaudited
(In millions, except for percentages and per share amounts)

Adjusted Net Income and Earnings per Share Reconciliations

	Three Months March 31,	
	2013	2012
Adjusted Net Income Reconciliation		
Income from continuing operations before non-controlling interests	$ 19.3	$ 11.7
Loss on extinguishment of debt, net of tax	3.4	—
Adjusted income from continuing operations	$ 22.8	$ 11.7
(Loss) income from discontinued operations, net of tax	(0.9)	2.5
Adjusted net income	$ 21.8	$ 14.2

Example 2: Type II disclosure (tax effects on non-GAAP exclusions are presented as a lump sum)
https://www.sec.gov/Archives/edgar/data/47217/000004721710000041/q4ex99-1_112210.htm

HEWLETT-PACKARD COMPANY AND SUBSIDIARIES
ADJUSTMENTS TO GAAP NET EARNINGS, EARNINGS FROM OPERATIONS,
OPERATING MARGIN AND EARNINGS PER SHARE
(Unaudited)
(In millions except per share amounts)

	Three months ended October 31, 2010
GAAP net earnings	$ 2,538
Non-GAAP adjustments:	
Amortization of purchased intangible assets	424
Restructuring charges	235
Acquisition-related charges	51
Adjustments for taxes	(184)
Non-GAAP net earnings	$ 3,064

Appendix B (continued)

Example 3: Type III disclosure (tax effects are separately reported for each exclusion item)

https://www.sec.gov/Archives/edgar/data/6284/000119312512493796/d450049dex991.htm

Analogic Corporation
NON-GAAP STATEMENTS OF OPERATIONS
RECONCILIATION

(In thousands, except per share data)	Three Months Ended	
	October 31, 2012	October 31, 2011
GAAP Income From Operations	$ 7,435	$ 5,584
Share-based compensation expense	2,644	2,251
B-K distributor matter inquiry related costs	75	997
Acquisition-related expenses	741	766
Non-GAAP Income From Operations	$ 10,895	$ 9,598
Percentage of Total Net Revenue	9.1%	8.1%
GAAP Net Income	$ 4,381	$ 4,026
Share-based compensation expense	1,821	1,551
B-K distributor matter inquiry related costs	49	639
Acquisition-related expenses	478	491
Non-GAAP Net Income	$ 6,729	$ 6,707

Note: in this example, Analogic Corporation has three exclusion items: share-based compensation expense, B-K distributor matter inquiry related costs, and acquisition-related expenses. Each of these three exclusions is presented both before tax and after tax, so we are able to work out the tax effect on each exclusion item. For example, the tax effect on share-based compensation expense is $2,644 – $1,821 = $823.

Appendix C: Variable Definitions

Variable	Definition
BTM	Book-to-market ratio, computed as common/ordinary equity (*ceqq*) divided by market value of equity (*prccq***cshoq*).
EARN	GAAP earnings (*ibq*) scaled by total assets (*atq*), multiplied by 100 for ease of presentation.
GAAP_ETR	Year-to-date GAAP effective tax rates, calculated as year-to-date total tax expense (*txtq*) scaled by year-to-date pre-tax income (*piq*), set to missing if pre-tax income is non-positive, or GAAP ETR is greater than one or smaller than zero.
MBE	Indicator variable coded one if reported non-GAAP earnings per share is greater than or equal to the median consensus analyst forecast, and zero otherwise.
MissAmount	The median consensus analyst forecast minus non-GAAP earnings calculated using GAAP ETR or statutory rate, multiplied by number of shares (*cshfdq*) and scaled by total assets (*atq*), multiplied by 100 for ease of presentation.
NG_EARN	Actual after-tax non-GAAP earnings reported by the firm, calculated as GAAP earnings before extraordinary items (*ibq*) plus total pre-tax non-GAAP adjustments (*Total_ADJ*), minus the tax effect of adjustments and nonrecurring tax items. Total pre-tax non-GAAP adjustments and total tax effect of adjustments are hand-collected from 8-Ks. For Type III observations, the nonrecurring tax item is hand-collected from 8-Ks. For Type II observations, we use Compustat variable *nrtxtq* to proxy for nonrecurring tax items. *NG_EARN* is scaled by total assets (*atq*) and multiplied by 100 for ease of presentation.
NG_EARN_{ETR}	Non-GAAP earnings calculated by applying GAAP ETR to non-GAAP exclusions. Computed as follows: GAAP earnings before extraordinary items (*ibq*) plus total pre-tax non-GAAP adjustments (*Total_ADJ*), minus the tax effect of adjustments (*Total_ADJ*×*GAAP_ETR*) and nonrecurring tax items. NG_EARN_{ETR} is scaled by total assets (*atq*) and multiplied by 100 for ease of presentation.
NG_EARN_{STR}	Non-GAAP earnings calculated by applying the statutory tax rate to non-GAAP exclusions. Computed as follows: GAAP earnings before extraordinary items (*ibq*) plus total pre-tax non-GAAP adjustments (*Total_ADJ*), minus the tax effect of adjustments (*Total_ADJ* ×*35%*) and nonrecurring tax items. NG_EARN_{STR} is scaled by total assets (*atq*) and multiplied by 100 for ease of presentation.
ΔNG_EARN_{ETR}	The effect of using a non-GAAP tax rate that differs from GAAP ETR on after-tax non-GAAP earnings, calculated as: *NG_EARN* - NG_EARN_{ETR}.

	ΔNG_EARN_{ETR} is scaled by total assets (*atq*) and multiplied by 100 for ease of presentation.
ΔNG_EARN_{STR}	The effect of using a non-GAAP tax rate that differs from the statutory rate on after-tax non-GAAP earnings, calculated as: *NG_EARN* - NG_EARN_{STR}. ΔNG_EARN_{STR} is scaled by total assets (*atq*) and multiplied by 100 for ease of presentation.
NonGAAP_TaxRate	Tax rate applied on non-GAAP adjustments, computed as the total tax effect of non-GAAP adjustments divided by total pre-tax non-GAAP adjustments, based on a hand-collected sample from 8-Ks.
Nonrecur_ADJ	Total amount of non-recurring non-GAAP adjustments, scaled by total assets (*atq*) and multiplied by 100 for ease of presentation. Nonrecurring adjustments include: restructuring charges, acquisition-related, asset impairments and writedowns, litigation-related, debt extinguishment, discontinued operations, gains and losses from assets, and other items.
Recur_ADJ	Total amount of recurring non-GAAP adjustments, scaled by total assets (*atq*) and multiplied by 100 for ease of presentation. Recurring adjustments includes: depreciation and amortization, stock compensation, foreign currency exchange, fair value adjustment, pension-related, and inventory step-up.
ROA	Income before extraordinary items (*ibq*) divided by total assets (*atq*), multiplied by 100 for ease of presentation.
Sales_Growth	Sales growth, computed as quarterly change in sales (*saleq*) over the same quarter in the prior year.
Size	The natural log of total assets (*atq*).
TaxRate_X	Non-GAAP tax rate applied on each type of non-GAAP adjustments (*X*). Take restructuring charge as an example. *TaxRate_Restuc* is calculated as the tax effect of excluding restructuring charge from GAAP earnings, divided by the amount of pre-tax restructuring charge excluded.
Total_ADJ	Total pre-tax non-GAAP adjustments scaled by total assets (*atq*) and multiplied by 100 for ease of presentation. *Total_ADJ* includes fourteen types of adjustments: (1) restructuring costs; (2) acquisition-related; (3) depreciation and amortization; (4) asset writedown; (5) litigation-related; (6) stock compensation; (7) debt extinguishment; (8) foreign currency exchange; (9) discontinued operations; (10) change in fair value; (11) pension-related; (12) gains and losses from asset sale; (13) inventory step-up; (14) other. Positive *Total_ADJ* means that non-GAAP earnings are greater than GAAP earnings and vice versa.

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Table 1 Sample selection

Sample screening criteria	# of firm-quarter obs
1. All 8-Ks from 2004 to 2014, with item number 2.02	201,715
2. Only keep 8-Ks that mention non-GAAP and tax-related keywords	18,219
a) Type I disclosure (i.e., non-GAAP exclusions disclosed net of tax)	2,715
b) Type II disclosure (i.e., tax effect of non-GAAP adjustments in one line item)	1,335
c) Type III disclosure (i.e., separately disclose the tax effect on each exclusion item)	2,446
d) Non-GAAP metric is on pretax basis	5,496
e) Other (cannot find relevant information, non-GAAP refers to income attributable to controlling interest, etc.)	6,227
3. Type II and III together	3,781
4. Firm-quarters with non-missing data to compute non-GAAP and GAAP tax rate	2,830
5. Firm-quarters with non-missing I/B/E/S and Compustat variables	2,714
6. Firm-quarters with non-missing one-year-ahead GAAP earnings	2,592

Table 2 Descriptive statistics: Non-GAAP tax rates

Panel A: Non-GAAP tax rates by disclosure type and sign of total non-GAAP exclusions

	N	Mean	Std Dev	P25	Median	P75
Type II	842	0.314	0.407	0.202	0.321	0.378
Type III	1872	0.307	0.345	0.208	0.328	0.376
Test mean diff		p-value = 0.64				

	N	Mean	Std Dev	P25	Median	P75
Exclusions < 0	416	0.385	0.543	0.242	0.365	0.401
Exclusions > 0	2298	0.296	0.321	0.203	0.316	0.370
Test mean diff		p-value < 0.0001				

Note: Panel A presents non-GAAP tax rate by disclosure type and sign of total non-GAAP exclusions. Under "*Type II*" disclosure format, firms disclose the total tax effect of non-GAAP exclusions as a single lump sum. Under "*Type III*" disclosure format, firms separately disclose the tax effect for every exclusion item. *Exclusions < 0 (> 0)* subsample includes firm-quarters with income-decreasing (income-increasing) non-GAAP exclusions. Non-GAAP tax rate is calculated as the total tax effect of non-GAAP exclusions divided by the total amount of pre-tax exclusions (excluding non-recurring tax items), winsorized at 1% tails.

Panel B: Non-GAAP tax rate by non-GAAP exclusion item

Variable	N	Mean	SD	P25	Median	P75
TaxRate_Restruc	898	0.291	0.132	0.226	0.307	0.364
TaxRate_MA	470	0.258	0.152	0.159	0.292	0.357
TaxRate_Depr_Amtz	182	0.266	0.154	0.186	0.318	0.369
TaxRate_Writedown	145	0.265	0.161	0.113	0.324	0.375
TaxRate_Litigation	162	0.318	0.138	0.292	0.368	0.389
TaxRate_Stock_Comp	225	0.277	0.146	0.231	0.318	0.366
TaxRate_Debt_Ex	56	0.343	0.115	0.346	0.373	0.384
TaxRate_For_Exch	47	0.323	0.247	0.210	0.302	0.379
TaxRate_Discont	9	0.323	0.104	0.252	0.326	0.389
TaxRate_FV_Change	113	0.366	0.098	0.364	0.372	0.390
TaxRate_Pension	67	0.389	0.137	0.340	0.376	0.400
TaxRate_Asset_Sale	59	0.320	0.120	0.263	0.359	0.391
TaxRate_Inventory	42	0.319	0.124	0.321	0.359	0.400
TaxRate_Other	810	0.313	0.163	0.240	0.353	0.383

Note: Panel B presents non-GAAP tax rates on each type of non-GAAP exclusions calculated using the Type III disclosure subsample (1,872 firm-quarters). For each non-GAAP exclusion, the non-GAAP tax rate is calculated as: tax effect of the exclusion divided by the pre-tax exclusion amount. Variable definitions are as follows: (1) *Restruc*: restructuring charges; (2) *MA*: merger and acquisition related charges; (3) *Depr_Amtz*: depreciation and amortization; (4) *Writedown*: asset write-downs and impairments; (5) *Litigation*: litigation related charges; (6) *Stock_Comp*: stock-based compensation expense; (7) *Debt_Ex*: debt extingsuihment; (8) *For_Exch*: foreign currency exchange gains and losses; (9) *Discont*: discontinued operations; (10) *FV_Change*: fair value adjustments; (11) Pension: pension related; (12) *Asset_Sale*: gains and losses from asset sale; (13) *Inventory*: inventory related; (14) *Other*: other non-GAAP exclusions.

Table 3 Descriptive statistics: Regression variables

Panel A: Summary statistics

Variable	N	Mean	SD	P25	Median	P75
ΔNG_EARN_{ETR}	2,714	0.024	0.318	-0.023	0.000	0.037
ΔNG_EARN_{STR}	2,714	0.039	0.271	-0.006	0.007	0.059
MBE	2,714	0.623	0.485	0.000	1.000	1.000
Total_ADJ	2,714	0.510	1.168	0.074	0.322	0.738
BTM	2,714	0.491	0.284	0.282	0.437	0.663
ROA	2,714	1.615	1.221	0.817	1.391	2.269
Sales Growth	2,714	0.079	0.213	-0.024	0.047	0.125
Size	2,714	8.343	1.631	7.099	8.291	9.446
$EARN_{t+4}$	2,592	1.489	1.499	0.740	1.402	2.311
NG_EARN	2,714	1.993	1.408	1.128	1.728	2.630
NG_EARN_{ETR}	2,714	1.973	1.387	1.113	1.733	2.632
NG_EARN_{STR}	2,714	1.960	1.363	1.109	1.711	2.589

Notes: Detailed variable definitions can be found in Appendix C. All continuous variables are winsorized at 1% tails. For ease of presentation, ΔNG_EARN_{ETR}, ΔNG_EARN_{STR}, *Total_ADJ*, *ROA*, $EARN_{t+4}$, *NG_EARN*, NG_EARN_{ETR}, and NG_EARN_{STR} are multiplied by 100.

Panel B: The effect of discretionary non-GAAP tax rate on non-GAAP earnings

		MBE = 0 (n=1022)	**MBE = 1** (n=1692)	**Difference** (p-value)
Non-GAAP tax rate	**Exclusions > 0** (n=2298)	0.331	0.277	0.0001
GAAP ETR		0.313	0.297	0.003
ΔNG_EARN_{ETR}		0.005	0.041	0.009
ΔNG_EARN_{STR}		0.023	0.072	<0.0001
Non-GAAP tax rate	**Exclusions < 0** (n=416)	0.333	0.446	0.035
GAAP ETR		0.313	0.273	0.001
ΔNG_EARN_{ETR}		-0.035	0.045	0.024
ΔNG_EARN_{STR}		-0.072	-0.031	0.221

Notes: The *MBE = 1 (0)* subsample includes firm-quarters that (fail to) meet or beat the median consensus analyst forecast. The exclusions > 0 (<0) subsample includes firm-quarters that have income-increasing (income-decreasing) non-GAAP exclusions. Sample size in each of the four clusters are as follows: (1) 225 in MBE = 0 and Exclusions < 0; (2) 797 in MBE = 1 and Exclusions > 0; (3) 191 in MBE = 1 and Exclusions < 0; (4) 1,501 in MBE = 1 and Exclusions > 0. *GAAP ETR* is the year-to-date GAAP effective tax rate, calculated as year-to-date tax expense (*txtq*) divided by year-to-date pre-tax income (*piq*), set to missing if the denominator is negative or zero or if the rate is greater than one or negative. ΔNG_EARN_{ETR} (ΔNG_EARN_{STR}) measures the effect of using a discretionary non-GAAP tax rate on after-tax non-GAAP earnings, where the discretionary non-GAAP tax rate is calculated as the difference between the actual non-GAAP tax rate and GAAP ETR (statutory tax rate). Detailed variable definitions can be found in Appendix C. All continuous variables are winsorized at 1% tails.

Table 3 (continued)

Panel C: Pearson correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ΔNG_EARN_{ETR}	1											
(2) ΔNG_EARN_{STR}	0.80***	1										
(3) MBE	0.07***	0.11***	1									
(4) Total_ADJ	0.25***	0.41***	0.13***	1								
(5) BTM	0.001	-0.02	-0.02	-0.08***	1							
(6) ROA	-0.10***	-0.11***	0.17***	-0.20***	-0.45***	1						
(7) Sales Growth	-0.02	-0.01	0.12***	-0.03	-0.04*	0.16***	1					
(8) Size	-0.06**	-0.04*	0.01	-0.07***	-0.08***	0.01	-0.05*	1				
(9) $EARN_{t+4}$	-0.04*	0.01	0.12***	0.07***	-0.39***	0.54***	0.10***	0.04	1			
(10) NG_EARN	0.23***	0.32***	0.25***	0.43***	-0.44***	0.75***	0.13***	-0.03	0.50***	1		
(11) NG_EARN_{ETR}	0.02	0.15***	0.23***	0.42***	-0.45***	0.78***	0.14***	-0.03	0.52***	0.96***	1	
(12) NG_EARN_{STR}	0.08***	0.14***	0.23***	0.38***	-0.45***	0.80***	0.14***	-0.03	0.53***	0.97***	0.99***	1

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C. All continuous variables are winsorized at 1% tails.

Table 4 Non-GAAP tax rates and the propensity to meet or beat analyst consensus

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{ETR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1a)$$
$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{STR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1b)$$

VARIABLES	Pred. Sign	(1) Y = MBE	(2) Y = MBE
ΔNG_EARN_{ETR}	+	0.339***	
		(0.120)	
ΔNG_EARN_{STR}	+		0.510***
			(0.144)
Total_ADJ	+	0.276***	0.251***
		(0.035)	(0.037)
BTM		0.634***	0.629***
		(0.128)	(0.127)
ROA		0.308***	0.307***
		(0.041)	(0.041)
SalesGrowth		0.649***	0.643***
		(0.170)	(0.171)
Size		0.030	0.027
		(0.021)	(0.021)
Constant		-1.090***	-1.070***
		(0.280)	(0.279)
Observations		2,714	2,714
Pseudo R-squared		0.088	0.090
SE clustered by		Firm	Firm
Year FE		Yes	Yes
Quarter FE		Yes	Yes

Notes: This table reports the results from estimating Eq. (1a) and (1b). In Column (1), GAAP ETR is used to proxy for non-discretionary non-GAAP tax rate. In Column (2), the statutory tax date is used to proxy for non-discretionary non-GAAP tax rate. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 5 Non-GAAP tax rates and the propensity to meet or beat analyst consensus – Alternative specification

$$\Delta NG\_EARN_{ETRit} = \beta_0 + \beta_1 MissAmount_{it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (3a)$$
$$\Delta NG\_EARN_{STRit} = \beta_0 + \beta_1 MissAmount_{it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (3b)$$

VARIABLES	Pred. Sign	(1) Y = ΔNG_EARN_{ETR}	(2) Y = ΔNG_EARN_{STR}
MissAmount	+	0.161***	
		(0.036)	
MissAmount	+		0.062*
			(0.035)
Total_ADJ	+	0.074***	0.097***
		(0.018)	(0.014)
BTM		0.034	0.010
		(0.033)	(0.029)
ROA		0.001	-0.001
		(0.014)	(0.012)
Sales_Growth		-0.001	0.007
		(0.063)	(0.057)
Size		-0.004	-0.000
		(0.005)	(0.005)
Constant		-0.028	-0.021
		(0.056)	(0.046)
Observations		2,714	2,714
R-squared		0.110	0.173
SE clustered by		Firm	Firm
Year FE		Yes	Yes
Quarter FE		Yes	Yes

Notes: This table reports the results from estimating Eq. (3a) and (3b). Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 6 Excluding firm-quarter observations with permanent BTD non-GAAP exclusions

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{ETR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1a)$$
$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{STR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1b)$$

VARIABLES	Pred. Sign	(1) Y = MBE	(2) Y = MBE
ΔNG_EARN_{ETR}	+	0.493**	
		(0.195)	
ΔNG_EARN_{STR}	+		0.924***
			(0.202)
Total_ADJ	+	0.310***	0.296***
		(0.054)	(0.055)
BTM		0.655***	0.671***
		(0.163)	(0.165)
ROA		0.250***	0.252***
		(0.058)	(0.059)
SalesGrowth		1.062***	1.058***
		(0.346)	(0.357)
Size		0.038	0.034
		(0.030)	(0.030)
Constant		-0.930**	-0.933**
		(0.364)	(0.366)
Observations		1,372	1,372
Pseudo R-squared		0.083	0.089
SE clustered by		Firm	Firm
Year FE		Yes	Yes
Quarter FE		Yes	Yes

Notes: This table reports the results from estimating Eq. (1a) and (1b) excluding firm-quarters with permanent BTD non-GAAP exclusions. In Column (1), GAAP ETR is used to proxy for non-discretionary non-GAAP tax rate. In Column (2), the statutory tax date is used to proxy for non-discretionary non-GAAP tax rate. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 7 Non-GAAP tax rates and the propensity to meet or beat analyst consensus – Analysis by disclosure type

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{ETR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1a)$$
$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{STR\,it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1b)$$

		Type II		Type III	
VARIABLES	Pred. Sign	(1) Y = MBE	(2) Y = MBE	(3) Y = MBE	(4) Y = MBE
ΔNG_EARN_{ETR}	+	0.353*		0.360**	
		(0.187)		(0.152)	
ΔNG_EARN_{STR}	+		0.418**		0.690***
			(0.206)		(0.194)
Total_ADJ	+	0.300***	0.275***	0.273***	0.245***
		(0.067)	(0.071)	(0.040)	(0.042)
BTM		0.642**	0.618**	0.602***	0.605***
		(0.292)	(0.294)	(0.138)	(0.136)
ROA		0.370***	0.369***	0.281***	0.280***
		(0.065)	(0.065)	(0.049)	(0.048)
SalesGrowth		0.148	0.141	1.152***	1.167***
		(0.221)	(0.219)	(0.229)	(0.231)
Size		0.013	0.009	0.040*	0.038*
		(0.042)	(0.041)	(0.023)	(0.023)
Constant		-0.684	-0.634	-1.270***	-1.267***
		(0.492)	(0.494)	(0.312)	(0.311)
Observations		842	842	1,872	1,872
Pseudo R-squared		0.103	0.103	0.0941	0.0977
SE clustered by		Firm	Firm	Firm	Firm
Year FE		Yes	Yes	Yes	Yes
Quarter FE		Yes	Yes	Yes	Yes

Notes: Columns (1) and (2) report the results from estimating Eq. (1a) and (1b) in the subsample of firms that disclose the tax effect of non-GAAP exclusion as a lump sum (Type II disclosure firms). Columns (3) and (4) report the results from estimating Eq. (1a) and (1b) in the subsample of firms that disclose the tax effect of every non-GAAP exclusion item (Type III disclosure firms). In columns (1) and (3), GAAP ETR is used to proxy for non-discretionary non-GAAP tax rate. In columns (2) and (4), the statutory tax date is used to proxy for non-discretionary non-GAAP tax rate. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 8 Non-GAAP tax rates and the propensity to meet or beat analyst consensus – Analysis by the relative magnitude of recurring versus nonrecurring adjustments

$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{ETR\ it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1a)$$
$$MBE_{it} = \beta_0 + \beta_1 \Delta NG\_EARN_{STR\ it} + \beta_2 Total\_ADJ_{it} + Controls + Year\ FE + Qtr\ FE + \varepsilon_{it} \quad (1b)$$

		Nonrecurring adj > 50%		Nonrecurring adj <= 50%	
	Pred.	(1)	(2)	(3)	(4)
VARIABLES	Sign	Y = MBE	Y = MBE	Y = MBE	Y = MBE
ΔNG_EARN_{ETR}	+	0.398**		0.261	
		(0.156)		(0.170)	
ΔNG_EARN_{STR}	+		0.734***		0.072
			(0.171)		(0.209)
Total_ADJ	+	0.271***	0.245***	0.308***	0.292***
		(0.043)	(0.044)	(0.059)	(0.060)
BTM		0.602***	0.618***	0.668***	0.665***
		(0.147)	(0.148)	(0.236)	(0.235)
ROA		0.291***	0.295***	0.372***	0.374***
		(0.045)	(0.045)	(0.062)	(0.062)
SalesGrowth		0.796***	0.807***	0.401	0.413
		(0.209)	(0.210)	(0.274)	(0.274)
Size		0.046*	0.042	0.017	0.015
		(0.026)	(0.026)	(0.029)	(0.029)
Constant		-1.193***	-1.182***	-0.860	-0.843
		(0.330)	(0.330)	(0.542)	(0.537)
Observations		2,022	2,022	692	692
Pseudo R-squared		0.0854	0.0903	0.119	0.117
SE clustered by		Firm	Firm	Firm	Firm
Year FE		Yes	Yes	Yes	Yes
Quarter FE		Yes	Yes	Yes	Yes

Notes: Columns (1) and (2) report the results from estimating Eq. (1a) and (1b) in the subsample of firms for which the majority (>50%) of exclusions are nonrecurring. Columns (3) and (4) report the results from estimating Eq. (1a) and (1b) in the subsample of firms for which the majority of exclusions are recurring. In columns (1) and (3), GAAP ETR is used to proxy for non-discretionary non-GAAP tax rate. In columns (2) and (4), the statutory tax date is used to proxy for non-discretionary non-GAAP tax rate. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 9 Non-GAAP tax rates and earnings persistence

$$EARN_{it+4} = \beta_0 + \beta_1 NG\_EARN_{it} + \varepsilon_{it+4} \quad (2a)$$
$$EARN_{it+4} = \beta_0 + \gamma_1 NG\_EARN_{ETRit} + \gamma_2 \Delta NG\_EARN_{ETRit} + \varepsilon_{it+4} \quad (2b)$$
$$EARN_{it+4} = \beta_0 + \gamma_1 NG\_EARN_{STRit} + \gamma_2 \Delta NG\_EARN_{STRit} + \varepsilon_{it+4} \quad (2c)$$

VARIABLES	Pred. Signs	(1) $EARN_{it+4}$	(2) $EARN_{it+4}$	(3) $EARN_{it+4}$
NG_EARN **(β_1)**	+	0.531***		
		(0.054)		
NG_EARN_{ETR} **(γ_1)**	+		0.563***	
			(0.052)	
ΔNG_EARN_{ETR}	?		-0.261	
			(0.166)	
NG_EARN_{STR} **(γ_1)**	+			0.583***
				(0.050)
ΔNG_EARN_{STR}	?			-0.346**
				(0.165)
Constant		0.531***		
		(0.054)		
Compare β_1 with γ_1 (p-value)			0.064	0.061
Compare to Column (1): Vuong Z-statistic (p-value)			-2.94 (0.003)	-2.83(0.005)
Observations		2,592	2,592	2,592
R-squared		0.265	0.290	0.292
SE clustered by		Firm	Firm	Firm
Year FE		Yes	Yes	Yes
Quarter FE		Yes	Yes	Yes

Notes: This table reports the results from estimating Eq. (2a) through (2c). Column 1 reports the results from estimating Eq. (2a), where NG_EARN_{it} represents the current period non-GAAP earnings firms report. Column 2 reports the results from estimating Eq. (2b). Column 3 reports the results from estimating Eq. (2c). Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 10 Robustness checks

Panel A: Use annual and current quarter GAAP ETR to proxy for the non-discretionary non-GAAP tax rate

VARIABLES	Pred. Signs	(1) Y = MBE	(2) Y = MBE
ΔNG_EARN_{ANNETR}	+	0.482***	
		(0.151)	
ΔNG_EARN_{QTRETR}	+		0.331**
			(0.148)
Total_ADJ	+	0.308***	0.325***
		(0.041)	(0.043)
BTM		0.730***	0.680***
		(0.135)	(0.134)
ROA		0.307***	0.279***
		(0.043)	(0.043)
SalesGrowth		0.635***	0.707***
		(0.191)	(0.176)
Size		0.031	0.025
		(0.022)	(0.022)
Constant		-1.089***	-1.060***
		(0.293)	(0.297)
Observations		2,489	2,504
Pseudo R-squared		0.0891	0.0852
SE clustered by		Firm	Firm
Year FE		Yes	Yes
Quarter FE		Yes	Yes

Notes: This table reports the results from estimating Eq. (1a) and (1b). In columns 1 (2), annual (current quarter) GAAP ETR is used to proxy for the non-discretionary non-GAAP tax rate. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.

Table 10 Robustness checks (continued)

Panel B: Exclude Type II firms with discrete tax items

VARIABLES	Pred. Signs	(1) Y = MBE	(2) Y = MBE
ΔNG_EARN_{ETR}	+	0.386***	
		(0.130)	
ΔNG_EARN_{STR}	+		0.639***
			(0.162)
Total_ADJ	+	0.282***	0.258***
		(0.036)	(0.037)
BTM		0.621***	0.617***
		(0.130)	(0.129)
ROA		0.302***	0.301***
		(0.044)	(0.044)
SalesGrowth		0.783***	0.782***
		(0.196)	(0.199)
Size		0.044**	0.043**
		(0.021)	(0.021)
Constant		-1.170***	-1.172***
		(0.286)	(0.286)
Observations		2,253	2,253
Pseudo R-squared		0.090	0.093
SE clustered by		Firm	Firm
Year FE		Yes	Yes
Quarter FE		Yes	Yes

Notes: This table reports the results from estimating Eq. (1a) and (1b) after dropping Type II observations with discrete tax items. We identify the existence of discrete tax items following Bratten et al. (2017). Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Detailed variable definitions can be found in Appendix C.